What is claimed is:

1. A method for identifying and localizing a reentrant circuit isthmus in a heart of a subject during sinus rhythm, comprising the steps of:

    a) receiving electrogram signals from the heart during sinus rhythm via electrodes;

    b) creating a map based on the received electrogram signals;

    c) determining, based on the map, a location of the reentrant circuit isthmus in the heart; and

    d) displaying the location of the reentrant circuit isthmus.

2. The method of claim 1, wherein step b) includes arranging activation times of the received electrogram signals based on a position of the respective electrodes.

3. The method of claim 2, wherein the activation times are measured from a predetermined start time until reception of a predetermined electrogram signal.

4. The method of claim 2, wherein the map includes isochrones for identifying electrogram signals having activation times within a predetermined range.

5. The method of claim 2, wherein step c) includes finding a center reference activation location on the map by averaging an electrode coordinate position of a predetermined number of electrogram signals selected based on an activation time.

6. The method of claim 5, wherein step c) includes defining measurement vectors originating from the center reference activation location and extending outward on the map, the measurement vectors used to designate the electrodes located along the measurement vectors.

7. The method of claim 6, wherein the electrodes assigned to a measurement vector are chosen according to a distance from the measurement vector.

8. The method of claim 6, wherein the electrodes assigned to a measurement vector are a subset of the electrodes chosen according to a distance from the measurement vector.

9. The method of claim 6, wherein step c) includes selecting from the measurement vectors a primary axis vector having one of an activation gradient value within a predetermined range and a highest activation uniformity value within a predetermined range and where the primary axis vector indicates a location of the reentrant circuit isthmus.

10. The method of claim 9, wherein the activation

uniformity value is a coefficient of linear regression.

11. The method of claim 9, wherein the activation uniformity value is a coefficient of non-linear regression.

12. The method of claim 9, wherein the activation uniformity value is a variance in activation times along a selected measurement vector.

13. The method of claim 9, wherein the activation uniformity value is a measure of variability along a selected measurement vector.

14. The method of claim 9, wherein the activation gradient value is a slope of a linear regression line.

15. The method of claim 9, wherein the activation gradient value is a slope of a non-linear regression line.

16. The method of claim 9, wherein the activation gradient value is a mean absolute difference in activation times along a selected measurement vector.

17. The method of claim 9, wherein the activation gradient value is a difference along the measurement vector

18. The method of claim 9, wherein step c) includes, when a primary axis vector is not found,

i) finding an alternate center reference activation location on the map by averaging an electrode coordinate position of a predetermined number of electrogram signals having an alternate characteristic,

ii) defining measurement vectors originating from the alternate center reference activation location and extending outward on the map, the measurement vectors used to designate the electrodes located along the vectors, and

iii) selecting from the measurement vectors a primary axis vector having one of an activation gradient value within a predetermined range and a highest activation uniformity value within a predetermined range.

19. The method of claim 18, wherein step d) includes when a primary axis vector is not found, selecting from the measurement vectors a primary axis vector having one of an activation uniformity value within a predetermined range and a highest gradient value within a predetermined range.

20. The method of claim 9, further comprising the step of:

e) determining, based on the map, a shape of the reentrant circuit isthmus in the heart; and

f) displaying the shape of the reentrant circuit isthmus.

21. The method of claim 20, wherein step b) includes generating duration values representing a time difference between a starting point and a stopping point in the electrogram signals.

22. The method of claim 21, wherein the one of the starting point and stopping point is computed to be when an amplitude of the electrogram signal is within a predetermined amount of an amplitude of the electrogram signal.

23. The method of claim 21, wherein step e) includes finding threshold points in which the difference in electrogram duration values between adjacent sites is greater than a predetermined time interval.

24. The method of claim 23, wherein step e) includes connecting the threshold points to form a polygon encompassing the center reference activation location.

25. The method of claim 24, wherein step e) includes

connecting the threshold points to form a polygon encompassing the center reference activation location and a predetermined portion of the primary axis vector and indicating a shape of the reentrant circuit isthmus in the heart.

26. The method of claim 25, further comprising the step of:

g) determining an ablation line to ablate the heart based on the location of the reentrant circuit isthmus; and

h) displaying the ablation line.

27. The method of claim 26, wherein step g) includes drawing the ablation line on the map bisecting the polygon and at a predetermined angle with respect to the primary axis vector.

28. The method of claim 27, wherein the ablation line traverses the polygon plus a predetermined distance.

29. A method for identifying and localizing a reentrant circuit isthmus in a heart of a subject during sinus rhythm, comprising the steps of:

a) receiving electrogram signals from the heart during sinus rhythm via electrodes;

b) creating a map based on the received

electrogram signals;

c) finding a center reference activation location on the map;

d) defining measurement vectors originating from the center reference activation location;

e) selecting from the measurement vectors a primary vector indicating a location of the reentrant circuit isthmus in the heart; and

f) displaying the location of the reentrant circuit isthmus.

30. The method of claim 29, further comprising the steps of:

g) finding threshold points of the electrogram signals on the map;

h) connecting the threshold points to form a polygon indicating a shape of the reentrant circuit isthmus in the heart; and

i) displaying the shape of the reentrant circuit isthmus.

31. The method of claim 28, further comprising the step of:

j) finding an ablation line based on the polygon; and

k) displaying the ablation line.

32. A system for identifying and localizing a reentrant circuit isthmus in a heart of a subject during sinus rhythm, comprising:

a) an interface for receiving electrogram signals from the heart during sinus rhythm via electrodes;

b) processing means for creating a map based on the received electrogram signals, and determining, based on the map, a location of the reentrant circuit isthmus in the heart; and

c) a display adapted to display the location of the reentrant circuit isthmus.

33. A system for identifying and localizing a reentrant circuit isthmus in a heart of a subject during sinus rhythm, comprising:

a) receiving means for receiving electrogram signals from the heart during sinus rhythm via electrodes;

b) storage means for storing electrogram data corresponding to the electrogram signals

received by the receiving means;

c) processing means for retrieving the electrogram data, creating a map based on the electrogram signals, finding a center reference activation location on the map, defining measurement vectors originating from the center reference activation location, selecting from the measurement vectors a primary axis vector indicating a location of the reentrant circuit isthmus in the heart, finding threshold points of the electrogram signals on the map, and connecting the threshold points to form a polygon indicating a shape of the reentrant circuit isthmus in the heart; and

d) a display for displaying one of the location and shape of the reentrant circuit isthmus.--